

551.515 (771)

THE LORAIN, OHIO, TORNADO, JUNE 28, 1924

By HERBERT C. HUNTER

[Weather Bureau, Washington, D. C., August 1, 1924]

Portions of four counties in north-central Ohio were visited on the afternoon of June 28 by the most destructive tornado which that State has known. From the beginning of the path to the end was 52 miles, in direction slightly north of east, but about half the path was over Lake Erie. Different reports of clouds and their movements, as observed, are not accordant, but probably there was but one tornado in the State that day, and it both began and ended over the land.

The first damage seems to have occurred at Vickery, in the northeastern part of Sandusky County, 12 miles west-southwest of Sandusky; here many houses and barns were destroyed or damaged and a few persons were hurt. Farm buildings and trees suffered at Whitmore and Castalia, the places next visited, and at the latter place a boy was killed.

Sandusky, Erie County, is a city of about 23,000 people; the official in charge of the Weather Bureau office there, C. C. Cooper, has furnished a detailed report¹² of the storm, which struck the city at 4:35 p. m. The destruction was practically confined to 9 blocks in the eastern part of the city, where office buildings and factories especially were damaged; on account of the Saturday half-holiday there were very few persons inside, but 3 perished in the wreck of an office building and there were 2 fatalities elsewhere in the city. The damage here was about \$1,500,000.

The storm center passed about 1,000 feet north of the Weather Bureau office at approximately 4:35, the barometer falling abruptly by 0.20 inch and within five minutes regaining its former height; the rain, which had been light since it started at 4:15, became heavy and so continued till 8:15, the total fall being 1.41 inches. The wind register indicated the quickest mile at the rate of 77 miles per hour.

The storm passed eastward out over Lake Erie. The displayman at Huron, about 10 miles east-southeast of Sandusky, reports very violent wind and much damage in part of that town, with the possibility that a storm went northeastward through the town and out over the lake to join the greater storm moving eastward from Sandusky.

The displayman at Vermilion, about 9 miles east of Huron, reports a strong gale, shifting gradually from south to west and northwest, as the large black cloud, seemingly a mile and a half in diameter, passed eastward over Lake Erie at a distance of perhaps 4 miles. Heavy rain and lightning prevailed for a long time and fragments of roofing were deposited, but there was no damage of consequence at Vermilion.

About 7 miles west of Lorain and probably a shorter distance about north-northeast of Vermilion, the 95-foot gasoline yacht *Oswichee* encountered the intense storm. The owner, J. A. Williams, of Cleveland, was en route to Put-in-Bay. Dr. M. L. Combes, also of Cleveland, furnished an account of the storm, as the yacht experienced it, to E. H. Emery, in charge of the Weather Bureau office at Cleveland; this is slightly condensed in the following:

It became evident [about 4:30] that an unusual storm was ahead of us. We saw a very black cloud, one-half mile wide at the water

line and much wider at the top. It traveled very fast and was full of lightning, with a peculiar, dirty, yellowish amber glare around it. It was a little north of west and came toward us, traveling southeast. We turned south under full speed until 4:45, at which time a waterspout shot out of it and then down to the water. It was funnel-shaped, base up, and the water seemed to rise to meet it, cone shape. Our barometer dropped to 28.7 just before it struck us. This was about 5:00 p. m. [Three and a half hours before, near Cleveland, the reading had been 29.3 inches. Lake Erie is 572 feet above sea level.]

We turned directly into the wind and storm; there was decided down pressure, and we figured this was the storm descending from the big, dark cloud. The pressure was terrific, but we had passed the center of the storm and were caught half way to the outer edge. The water boiled and seemed to flatten into innumerable whirling or circling eddies, anticlockwise. The fury lasted for 20 minutes, with continuous streak lightning; the roar was so great that we could not hear the thunder. Then the waterspout went across our stern, drenching us with water, followed by a heavy spray and a very decided suction, which lifted the pipe from our furnace as the air rushed up into the vacuum formed. It also pulled up the canvas which covered the top deck and was nailed down around the edges. We were in complete darkness for 20 minutes, followed by a dirty, yellowish, amber glare. * * * The waterspout passed southeast in a direct line to Lorain, and was followed by a terrible rainstorm and high sea. * * * We fought the waves and the high wind, and after two attempts got into Vermilion River at 7:30 p. m.

The *Oswichee* * * * has two 80-horsepower engines and two propellers. When we could not keep her into the wind we would stop one engine and run the other; we did this a number of times; otherwise we would have been lost. * * * Captain Arberts had sailed 50 years on the ocean, and had seen many typhoons; he estimated the wind velocity between 90 and 100 miles an hour.

Lorain, with 37,000 people, in the county of the same name, is divided by Black River, the larger part of the city being west of the river. The chief business street, Broadway, is, for a long distance from the lake shore southward, the first highway west of the river. The time of the tornado, as nearly as can be determined, was 5:08 to 5:11 p. m.

Mr. Emery, after careful inspection and consultations with numerous witnesses, reports that "the storm, coming off the lake from the northwest, entered the city in the vicinity of the municipal bathhouse. Its path varies in width from 4,000 feet to 500 feet, while its length from where it started on land to the place where it lifted is between 3 and 3½ miles." From the bathhouse eastward to beyond the mouth of Black River the northern limit was over the lake. The width of the area of destruction was greatest near Broadway and the river, while east of the river, as the storm went inland, the path contracted considerably in width.

The wreckage at many places clearly indicated rotary winds, and several persons saw the funnel-shaped cloud, although the majority of eyewitnesses failed to recognize it. One of the best statements was secured from Mrs. Hattie C. Hale, who was standing at a window on the third floor of the Opera House Building, and saw the cloud in the northwest.

Mrs. Hale reports that heavy rain had been falling for some time.

All at once the rain higher up seemed to come in streaks and was being blown very swiftly from the northwest high up in the air, but lower down the trees were all bending toward the north. * * * Then I noticed the perfectly formed, funnel-shaped cloud, with its tail flowing or waving gracefully from it, while the larger part of the cloud was revolving very fast and increasing as it grew nearer.

A large part of the chief business section was laid waste and considerable parts of the residential districts; so that a conservative estimate, made several weeks later

¹² The reports of Messrs. Emery and Cooper, with the statements of the displaymen at Huron and Vermilion and the letter of Dr. Combes to Mr. Emery, also a chart of Lorain and many photographs, are filed in the Weather Bureau archives, where they may be consulted.



FIG. 1.—Lorain, Ohio, after tornado of June 28, 1924; Broadway, looking south



FIG. 2.—Wreckage in Lorain, seen from a high roof



FIG. 3.—Part of Lorain's business district, greatly damaged by the tornado

put the monetary loss of Lorain at \$11,000,000. The loss of life, including the deaths later from injuries, was 73, 8 of these being killed in the bathhouse and 15 in the State Theater. However, 39 names remain on the list of missing at this writing. About 200 were enough injured to need surgical treatment.

Three photographs of the damaged buildings and the wreckage in the streets of Lorain are reproduced; they were obtained through the courtesy of the Cleveland Daily News and the Chicago Herald and Examiner, respectively.

Regarding the effect of the terrific wind on structures, Mr. Emery states:

There were examples of buildings destroyed and those adjoining receiving little or no damage. Many wrecked buildings had their walls blown in and others their walls blown out. Most of the business blocks wrecked were not of modern construction. The Antlers Hotel, of steel construction, directly in the path of the storm, was not harmed beyond having one corner of its roof damaged.

The tornado settled down again at Sheffield, 5 miles from Lorain, and again at Avon, about 3 miles still farther east, and once more at West Dover, 4 miles beyond. The last-named place is just east of the western limit of Cuyahoga County, but 14 miles from Cleveland. There was damage at each of these places, and press reports state that three deaths occurred at Avon and one at West Dover.

There were high winds over much of Ohio that afternoon and evening, but the information at hand does not clearly indicate any tornado other than the one just outlined. In the northwestern part of Pennsylvania, however, there seems to have been a true tornado near Meadville, in which five lives were lost. The place is so far east of Cuyahoga County, Ohio, and the hour stated (6 p. m.) is so early that this is not considered a reappearance of the Ohio tornado.

Heavy rains, over a period of several hours, marked the weather of northern Ohio that afternoon and evening, and floods sufficient to cause considerable damage occurred in many of the small streams.

The area experiencing high winds in connection with the eastward movement of the LOW extended from the

eastern portions of Nebraska and South Dakota, where the strongest winds came at a late hour of the 27th, to west-central New York, where the wind was highest usually after noon of the 29th. There were hailstorms in a few portions of this area, and in portions of Iowa, Illinois, and western Pennsylvania, as well as northern Ohio, some districts had downpours sufficient to cause washouts.

The LOW, which is designated X on Chart II of this REVIEW, was central in Nebraska at the evening observation of the 27th, with sea-level reading of 29.52 inches at Valentine; in northeastern Iowa on the morning of the 28th, readings 29.54 inches at Charles City and La Crosse; in lower Michigan the next evening, reading 29.54 inches at Detroit; and near Parry Sound, Ontario, the morning of the 29th, reading 29.36 inches.

The early press reports of the disaster indicated that the losses of life and property at Lorain were so great that the damage greatly and the deaths probably exceeded any previous record of a single tornado; that the damage might equal that at Galveston, Tex., in the hurricane of September, 1900, a storm of quite different type. These early estimates fortunately proved much worse than the truth, though the whole track of the tornado shows 83 deaths and \$13,000,000 damage.

Yet \$13,000,000 far exceeds the property loss of any tornado for many years back, and, indeed, but two recent years have shown a greater aggregate tornado loss of the whole country during an entire year—1920, with somewhat more than \$15,000,000, and 1917, with about \$14,500,000. The St. Louis tornado of May 27, 1896, caused damage of about \$12,900,000; but the increase which has since occurred in the value of buildings should be remarked.

Regarding great losses of life, the southern tornado in South Carolina, on April 30 of this year, cost 67; no other tornado has killed so many since April 20, 1920, when one in Mississippi and Alabama cost 87. North of the Ohio River no record nearly so great is found since the 103 of the long tornado of May 26, 1917, which was especially destructive at Mattoon and Charleston, Ill. The loss of life in the St. Louis tornado was 306.

THE SOUTHERN MARYLAND WINDSTORM OF JUNE 8, 1924

551.515 (752)

By B. FRANCIS DASHIELL

On the afternoon of Sunday, June 8, 1924, a windstorm of unprecedented severity passed rapidly over southern Maryland and within a few minutes had caused damage which is conservatively estimated at \$650,000. Ordinarily the section referred to is pleasantly free from severe windstorms, and the residents do not recall any storms which even approximate the one of June 8 in such widespread devastation.

The wind, from all appearances, was a straight blow, but a few tornadic effects are indicated at some places. The writer while making a visit to the sections which experienced the storm was unable to obtain any reports as to whether there were clouds having the aspect of a tornado. The wide path in which the storm passed would also indicate a straight blow. Each person interviewed gave a similar report relative to the characteristics of the clouds, and the following description may be said to be a composite description of the cloud appearance before and during the storm. Many people, as well as two Weather Bureau cooperative observers, state

that the cloud was the swiftest moving cloud that they had ever observed. Previous to the approach of the storm the sky to the southwest and west took on a yellowish-red lurid glare and was accompanied by a steady roar of thunder, which increased rapidly in intensity as the dark clouds covered the sky. This darkness was not experienced in all localities, but in Washington for a few minutes the darkness was great enough to compel motorists to put on their lights. One cooperative observer stated that the cloud took on the appearance of a flat blanket and rolled at the advancing edge. The red and lurid glare seems to have predominated, as no one who saw the advance of the storm failed to mention this feature. The speed with which the storm advanced may be estimated from the fact that in some cases it was well in progress before windows could be closed.

The wind direction was first southwest and immediately reached a very high velocity, but within a few minutes it suddenly shifted to the northwest and with increased intensity. The velocity can not be estimated,